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SYNTHETIC RESIN HEAT-RESISTANT BOTTLE TYPE CONTAINER

[0001] This application is the U.S. National Stage of PCT/JP2004/017419 filed November 24, 2004, which claims priority from Japanese Patent Application No. JP2003-395564 filed November 26, 2003, and Japanese Patent Application No. JP2004-339150 filed November 24, 2004, the entire disclosures of which are incorporated herein by reference thereto in their entireties.

TECHNICAL FIELD

~~[0001]~~[0002] The present invention relates to a synthetic resin heat-resistant bottle type container, and particularly to a bottle type container having a plurality of pressure reduction absorbing panels at a body part.

BACKGROUND ART

~~[0002]~~[0003] In a synthetic resin heat-resistant bottle having a plurality of pressure reduction absorbing panels at a body part, ~~concaves and convexes~~concave and convex portions are formed on a body part surface to delimit the pressure reduction absorbing panels, respectively. Thus, in blow molding such a bottle, it has been likely that smooth stretching of a resin is obstructed at mold surface portions corresponding to ~~concaves~~ the concave and ~~convexes~~ convex portions of the body part surface.

~~[0003]~~[0004] Such a phenomenon is particularly significant in slender bottles each having a circumferential draw ratio of 2.8 or less, and particularly 2.65 or less, for example. Here, the "circumferential draw ratio" can be defined as a dimensional ratio between: a dimension from a central axis of a bottle to a thickness center of a wall face of a body part of the bottle (in case of a rectangular bottle, a wall face of a body part of the bottle except for corner portions thereof); and a dimension from a central axis of a preform to be used for molding of the bottle, to a thickness center of a wall face of a body part of the preform.

~~[0004]~~[0005] Namely, ~~in a situation where~~when a body part surface of such a slender bottle is formed with concave and convex portions ~~which~~ that lead to obstructions of a mold inner surface against vectors directed from a mouth part toward a bottom part of the bottle, ~~there are frequently caused~~ resin accumulation, whitening, and the like are frequently caused at mold surface portions corresponding

to the concave and convex portions of the body part ~~surface,~~surface. ~~thereby~~This not only ~~failing to avoid~~results in a defective appearance of the container but also ~~bringing about a cause of affection~~ has an adverse affect on heat resistance thereof.

~~[0005]~~[0006] Note that~~, as means for avoiding~~ To avoid locally decreased wall thickness caused by stretching of a resin upon blow molding, JP 2002-255141A proposes a heat-resistant bottle provided with a lateral concave rib along a boundary between a shoulder part and a body part of the bottle in a manner that the lateral concave rib has a rib bottom diameter set at 0.85 to 0.92 times an outer diameter of a cylindrical surface of the body part.

DISCLOSURE OF THE INVENTION

~~[0006]~~[0007] It is an object of the ~~present~~ invention to propose a novel and slender bottle ~~which~~ that solves the above-described problems in the related art and ~~which~~ allows a resin to smoothly stretch even at mold surface portions corresponding to ~~concaves and convexes~~concave and convex portions of a body part surface upon blow ~~molding~~ molding.~~to thereby avoid occurrence of~~ This avoids a defective appearance and ~~eliminate an affection on~~ does not adversely affect heat resistance of the bottle.

~~[0007]~~[0008] The ~~present~~ invention resides in a synthetic resin heat-resistant bottle type container having pressure reduction absorbing panels at a container body part and having a circumferential draw ratio of 2.8 or less, for example, wherein the bottle type container comprises at least one convex portion along a wall face of each of the pressure reduction absorbing panels.~~, the~~ The convex portion ~~having~~ has a width larger at a lower side than at an upper side as viewed in a circumferential direction of the container.

~~[0008]~~[0009] According to the above ~~configuration of the present invention,~~configuration, the convex portion formed at the wall face of the pressure reduction absorbing panel is configured to have a width larger at a lower side than at an upper side as viewed in a circumferential direction of the ~~container,~~ container.~~thereby rarely causing~~ Thereby, obstructions against vectors directed from a container mouth part toward a bottom part in a stretching direction of a resin upon blow ~~molding,~~molding are rarely caused. ~~thereby making~~This makes it possible to restrict the occurrence of resin accumulation, whitening, and the like, and to mold the container into a desired wall thickness.

~~[0009]~~[0010] It is preferable that the at least one convex portion comprises two or more convex portions ~~alignedly provided~~aligned in a stepwise configuration on the wall face of the pressure reduction absorbing panel.

~~[0010]~~[0011] It is also preferable that the convex portion has ridge lines in an inverted ~~V-shape~~V-shape downwardly widened from a container mouth part toward a bottom part. In this case, it is desirable that the ridge lines define a central angle of 60° to 125° therebetween.

~~[0011]~~[0012] Instead of the above configuration, it is possible that the convex portion is in a substantially trapezoidal shape having an upper side and a lower side parallel to each other, the lower side being longer than the upper side. Also ~~in this case~~, it is desirable that the trapezoid includes opposed sides ~~which~~that are ~~nonparallel~~non-parallel to each other and ~~which~~ cooperatively define an angle of 60° to 125° therebetween.

~~[0012]~~[0013] ~~In case that~~A resin is more effectively stretched during blow molding when the at least one convex portion comprises two or more convex portions ~~alignedly provided~~aligned in a stepwise configuration on the wall face of the pressure reduction absorbing panel, and/or ~~in case that the~~when a convex portion is formed at a wall face of the panel having ridge lines in an inverted ~~V-shape~~V-shaped or ~~the convex portion in~~having a substantially trapezoidal shape ~~having~~with a lower side longer than an upper side. ~~side, is formed at the wall face of the pressure reduction absorbing panel, there is stretched a resin in a more excellent manner along the ridge line upon blow molding, thereby~~This assuredly ~~enabling exhibition of the above-described effects to restrict~~restricts occurrence of resin accumulation, whitening, and the like, and ~~to mold~~molds the container into a desired wall thickness.

~~[0013]~~[0014] Further, it is desirable that the pressure reduction absorbing panels each have a border line bulged toward the container bottom part along the wall face of the applicable pressure reduction absorbing panel. Although the boundary between each pressure reduction absorbing panel and the body part at the upper side of the panel is an area where a resin accumulation is particularly apt to be caused upon blow molding, the border line at such a site is configured to be bulged toward the container bottom part along the wall face of the applicable panel, thereby enabling effective promotion of uniform stretching of resin.

~~[0014]~~[0015] ~~Note that it~~It is most effective to combine: (1) the configuration

including the convex portion which is provided along a wall face of the pressure reduction absorbing panel and ~~which has~~having a width larger at a lower side than at an upper side as viewed in a circumferential direction of the container; with (2) the configuration including the pressure reduction absorbing panel having the border line bulged toward the container bottom part along the wall face of the panel. However, it has been confirmed that stretching of resin can be promoted to a practically sufficient level to thereby practically sufficiently restrict occurrence of resin accumulation, even by only one of the configurations.

BRIEF DESCRIPTION OF THE DRAWINGS

~~[0015]~~[0016] The present invention will be described in more ~~concretely~~detail with reference to the drawings.

~~[FIG. 1]~~[0017] FIGS. 1A, 1B and 1C are a front view, a plan view, and a bottom view of a container according to an embodiment of the present invention, respectively.

~~[FIG. 2]~~[0018] ~~A cross-sectional~~ FIG. 2 is a cross-sectional view taken long a line II-II of FIG. 1A.

~~[FIG. 3]~~[0019] ~~A side~~FIG. 3 is a side view of a preform preferably usable for blow molding of the container according to the present invention.

~~[FIG. 4]~~[0020] ~~A front~~FIG. 4 is a front view of a container according to another embodiment of the present invention.

~~[FIG. 5]~~[0021] ~~A cross-sectional~~FIG. 5 is a cross-sectional view taken along line V-V of FIG. 4.

~~[FIG. 6]~~[0022] ~~A front~~FIG. 6 is a front view of a container according to still another embodiment of the present invention.

~~[FIG. 7]~~[0023] ~~A cross-sectional~~FIG. 7 is a cross-sectional view taken along line VII-VII of FIG. 6.

BEST MODE FOR CARRYING OUT THE INVENTION

~~[0016]~~[0024] FIGS. 1A, 1B and 1C show an embodiment of a synthetic resin heat-resistant container according to the present invention constituted as a slender rectangular bottle having a filling capacity of about 350 milliliter and a circumferential draw ratio of 2.8 or less. Reference numerals 1 designate wall faces constituting a container body ~~part, respectively, reference~~part. Reference numerals 2 designate corner portions connecting end portions of wall faces 1 to similarly

constitute the container body ~~part, respectively, reference~~part. Reference numeral 3 designates a groove portion provided around the container body ~~part, reference~~ part. Reference numerals 4 designate upper panels provided at the wall faces 1 above the groove portion 3 so as to absorb pressure reduction~~, respectively, and reference~~. Reference numerals 5 designate lower panels provided at the wall faces 1 below the groove portion 3 so as to absorb pressure ~~reduction, respectively.~~reduction.

~~[0017]~~[0025] The upper panels 4 and lower panels 5 are connected to the container body part through sidewalls 4a and 5a directed toward an inside of the container, respectively, and edges of the sidewalls 4a and 5a constitute borders of the panels, respectively. Among them, each sidewall 5a positioned at an upper side of the lower panel 5 comprises a partial sphere defined by an arcuate border line bulged toward a container bottom part. Namely, each sidewall 5a located at the upper side of the lower panel 5 has a width larger at an upper side than at a lower side as viewed in a circumferential direction of the container.

~~[0018]~~[0026] Reference numerals 6 designate convex portions shown as ~~examples~~ an example as two portions aligned~~alignedly provided by two in number~~ in a central axis direction of the container with a spacing therebetween, at a wall face 5b of the lower panel 5. The convex portions 6 have ridge lines 6a, 6b, respectively, each of which is in an inverted ~~V-shape~~ V-shape downwardly widened from a container mouth part toward a bottom part when viewed from a front side of the container. As shown in FIG. 2, the applicable convex portions 6 are continuously arranged in a stepwise configuration, such that a lower side constituting a cross-section of each convex portion 6 is formed to extend outwardly and upwardly of the body part at an angle of 35° or less relative to a central axis X of the container.

~~[0019]~~[0027] ~~In case of adopting~~When using a preform shown in FIG. 3 so as to perform biaxial-stretching blow molding of ~~the~~a slender bottle type container, such as that shown in FIGS. 1A, 1B and 1C, under a molding condition of a smaller circumferential draw ratio (typically, a circumferential draw ratio of 2.8 or less, and particularly 2.65 or less), it is general that a resin is rarely stretched at a lower region of the preform so that an upper region of the preform is brought to contact with a mold surface before the lower region contacts with the mold surface. This results in non-uniformity of the resin stretching between the upper region and lower region thereof, ~~thereby tending~~and tends to cause resin accumulation and

~~whitening~~whitening, which in turn cause a defective appearance. Nonetheless, the ~~present~~ invention has provided the convex portions 6 at the wall faces of the lower panels 5, respectively, with each convex portion 6 having a mountain-like cross-section having a width larger at a lower side than at an upper side in a circumferential ~~direction,~~direction. ~~Thereby~~ This configuration rarely ~~causing~~causes obstructions against vectors directed from the mouth part toward the bottom part in a stretching direction of the ~~resin;~~resin. Moreover, when ~~while~~ the convex portions 6 are each provided to have ridge lines in the inverted ~~V-shape,~~V-shape, ~~thereby causing~~ the resin ~~to be~~is smoothly stretched upon blow molding to thereby mitigate or avoid resin accumulation and whitening.

~~[0020]~~**[0028]** Particularly, although resin accumulation is apt to be caused at an upper portion of each lower panel 5 upon blow molding, the panel border line at the sidewall 5a at the upper side has an arcuate border line bulged toward the container bottom ~~part, thereby causing~~part. This causes the resin to be more smoothly stretched to thereby more assuredly restrict occurrence of resin accumulation.

~~[0021]~~**[0029]** It is preferable for each convex portion 6 to have between its ridge lines a central angle θ of about 60° to 125° for bringing about smooth stretching of a resin.

~~[0022]~~**[0030]** In the above-described embodiment, the convex portions 6 have been shown as examples ~~alignedly provided by~~to include two ~~in number~~aligned portions with a spacing ~~therebetween, and in this case, continuously~~ therebetween. Continuously arranging the convex portions 6 in a stepwise configuration as shown in FIG. 2 enables a resin to be more smoothly stretched.

~~[0023]~~**[0031]** ~~It is needless to say that~~Of course the cooperating convex portions 6 can be increased or decreased in number depending on draw ratios and are not limited to ~~the situation where they are provided by two in number,~~ two, and ~~that~~ the convex portions can be provided not only at the lower panels 5 but also at the upper panels 4, respectively.

~~[0024]~~**[0032]** In another embodiment shown in FIG. 4 and FIG. 5, convex portions 6 are each configured to have a trapezoidal shape having a width larger at a lower side than at an upper side in a circumferential direction. It is also possible for each convex portion 6 to have a sideways fallen trapezoidal shape in a longitudinal cross-section of a container, such that the trapezoid has a side parallel to a central axis X of

the container, as a top side of the trapezoid (i.e., as a region most apart from the central axis X of the container). ~~Also in these cases, it is possible to~~These may obtain the same effects as the previously described embodiment.

~~[0025]~~[0033] In an embodiment shown in FIG. 6 and FIG. 7, convex portions 6 are not provided along wall faces 5b of lower panels 5. However, ~~identically to the above-described embodiments,~~ sidewalls 5a positioned at upper sides of the lower panels 5 each comprise a partial sphere defined by an arcuate border line bulged toward a container bottom part. Namely, each sidewall 5a positioned at the upper side of the lower panel 5 has a width larger at an upper side than at a lower side as viewed in a circumferential direction of the container.

~~[0026]~~[0034] In case of biaxial-stretching blow molding of the slender bottle type container, such as that shown in FIG. 6 and FIG. 7, under a molding condition of a smaller circumferential draw ratio, each sidewall 5a has an arcuate panel border ~~line to thereby~~line. This sufficiently ~~promote~~promotes stretching of a resin, thereby making it possible to effectively restrict occurrence of resin accumulation, even without provision of convex portions 6 along the wall faces 5b of the lower panels 5.

~~[0027]~~[0035] ~~Note that, in~~In any one of the above-described embodiments, each border line delimiting the sidewall 5a positioned at the upper side of the lower panel 5 may be in an appropriate shape other than the arcuate shape insofar as it is bulged toward a container bottom part, such as a trapezoidal shape, ~~V-shape,~~a V-shape, and a ~~U-shape,~~U-shape, each having an upper side longer than a lower side.

~~[0028]~~[0036] According to the ~~present~~ invention ~~as~~ described above, it is possible to stably mold an excellent slender bottle ~~which is~~ capable of avoiding the occurrence of a defective appearance of the bottle ~~and eliminating affection on~~ without adversely affecting heat resistance thereof, by smoothly stretching a resin even at mold surface portions corresponding to ~~concaves and convexes~~concave and convex portions of a body part surface upon blow molding.

~~[0029]~~[0037] ~~It is needless to say that the present~~The invention is not limited to the above-described embodiments, and many variations and modifications are possible within the scope of the invention.

ABSTRACT

A slender synthetic resin heat-resistant bottle type container having a circumferential draw ratio of 2.8 or less, for example, comprises at least one pressure reduction absorbing ~~panels~~ panel (5) provided at a container body part, wherein the pressure reduction absorbing ~~panels are each~~panel is provided with at least one convex portion (6) having a width larger at a lower side than at an upper side as viewed in a circumferential direction of the ~~container, and/or~~container. Alternatively, each ~~the~~ pressure reduction absorbing ~~panels each have~~ panel has a border line bulged toward a container bottom ~~part, thereby causing~~part. This causes a resin to be smoothly stretched even at mold surface portions corresponding to ~~concaves and convexes~~concave and convex portions of a container body part surface upon blow ~~molding,~~molding. ~~thereby avoiding occurrence of~~These avoid a defective appearance of the container and ~~eliminating an affection~~do not adversely affect ~~on~~ heat resistance thereof.